

REMARKS

Claims 1-41 are pending in this application. Claims 1-41 stand rejected in the referenced office action. Reconsideration of the application as amended is respectfully requested. The Examiner's rejections are addressed in substantially the same order as in the referenced office action.

The present invention is a method and apparatus for determining a parameter of interest of an earth formation using a Nuclear Magnetic Resonance (NMR) tool conveyed in a borehole in the earth formation. A magnet on the NMR tool applies a static magnetic field to the earth formation and aligns nuclear spins. The effective magnetic field gradient is different from the applied static magnetic field due to the presence of an internal field gradient. A series of radio frequency (RF) diffusion editing magnetic pulse sequence are applied. In a diffusion editing sequence, a latter portion of the pulse sequence refocuses a final echo produced by the earlier portion of the pulse sequence. The diffusion editing sequence is applied at one or more different frequencies. From the ensemble of received signals, the T₂ spectral distribution and the diffusion coefficients are determined. These determinations make it possible to determine parameters of interest of the earth formation such as total porosity, clay bound water, bound volume irreducible, gas saturation and oil saturation may be determined..

The independent claims 1, 20, 32, 34 and 37 have been amended to include the determination of the parameters of interest from signals that are all substantially affected by the internal field gradient. Support for this limitation is found in paragraph [0029]-[0030] of the application.

Dependent claim 2 has been amended to clarify the claim language.

Dependent claim 12 has been amended to clarify the claim language and change its dependency.

Dependent claim 13 has been amended to clarify the claim language.

Dependent claim 15 has been amended to clarify the claim language.

Dependent claim 21 has been amended to clarify the claim language.

Dependent claim 23- 25 have been amended to clarify the claim language.

All the apparatus claims have been amended to remove functional language.

No new matter has been added by the amendments.

REJECTIONS UNDER 35 USC § 102

Claims 1-41 stand rejected under 35 USC § 102(e) as being anticipated by US 6,522,136 to *Hurlimann*. Claims 1, 20, 32, 34 and 37 are independent claims.

The Examiner has pointed to claim 1 of *Hurlimann* as anticipating the independent claims of the invention. Applicant notes that claim 1 of *Hurlimann* requires the use of signals that are not affected by the internal field gradient. See col. 9, lines 40-43, col. 9 lines 52-54. In addition, a review of *Hurlimann* shows that the teachings

therein are based on the use of NMR signals that are unaffected by the internal field gradient. In this regard, the *Hurlimann* reference is similar to the *Hurlimann* '171 patent discussed in the present application.

In order for a claimed invention to be unpatentable under 35 USC § 102 over a prior art reference, the prior art reference must disclose each and every limitation of the claim arranged as in the claim. This is clearly lacking in the present case. Accordingly, applicant respectfully submits that claim 1 and claims 2- 19 that depend upon claim 1 are patentable under 35 USC §102 over *Hurlimann*.

In addition, there is no teaching or suggestion in *Hurlimann* or the prior art of record to use only signals that are substantially affected by the internal field gradient to determine a parameter of interest, the determination accounting for the effects of the internal field gradient. Accordingly, applicant further submits that claim 1 and claims 2- 19 that depend upon claim 1 are also patentable under 35 USC § 103 over *Hurlimann* and the prior art of record.

Independent claims 20, 32, 34 and 37 have been amended to include the substantive limitations of claim 1 discussed above. Accordingly, applicant further submits that claims 20, 32, 34 and 37 and all claims dependent thereon are patentable under 35 USC §§ 102-103 over *Hurlimann* and the prior art of record for the same

reasons that claim 1 is patentable under 35 USC §§ 102-103 over *Hurlimann* and the prior art of record.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 02-0429 (584-34206-US).

Respectfully submitted,

Dated: June 8, 2005



Kaushik P. Sriram, Reg. No. 43,150
Madan, Mossman & Sriram, P.C.
2603 Augusta, Suite 700
Houston, Texas 77057
Telephone: (713) 266-1130
Facsimile: (713) 266-8510